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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Jurgen Schulz-Harder

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EXAMINER

MEHTA, MEGHA S

ART UNIT

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1793

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/506,611	Applicant(s) SCHULZ-HARDER, JURGEN	
	Examiner MEGHA MEHTA	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 August 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-9,11 and 13-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-9,11 and 13-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 11 is objected to because of the following informalities: It is dependent on a cancelled claim. For purposes of examination, it will be interpreted as dependent on claim 1.

Appropriate correction is required.

2. Claim 6 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Part c) of claim 1 requires the brazing resist to be applied after structuring.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1 and 23 recite the limitations "a structured metal layer," "the structured copper layer," "one metal foil," "one metal layer," "the metal layer," "the structured metal layer," "the structured metal layer," "the structured copper layer" and "the structured metal layer" in lines 2, 3, 4, 6, 7, 8, 9, 11 and 12. There is insufficient antecedent basis for these limitations in the claim. The Examiner appreciates that these are all referring to the same copper layer on the ceramic substrate. However, the copper layer must be referred to by only one phrase or it becomes unclear if there is another, separate layer involved.

5. Claim 1 recites the limitation "the at least one coating" in line 9. There is insufficient antecedent basis for this limitation in the claim.

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6. Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear if the coating of brazing resist is the same coating of brazing resist referred to in claim 1. The coating in claim 1 is applied after structuring, but the coating in claim 5 is applied before structuring.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1, 3-9, 11, 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,054,762 Sakuraba et al.

Regarding claim 1, Sakuraba teaches a process for producing a metal-ceramic substrate comprising a ceramic layer **1** and a structured metal layer **3** with conductive tracks and contact surfaces on at least one surface side of the ceramic layer (column 1 lines 8-11 and column 2, lines 54-57) and a brazing resist applied to the structured copper layer (column 3, lines 4-5), the process comprising the following steps: a) applying at least one metal foil to at least one surface side of the ceramic layer by high temperature bonding at a bonding process temperature higher than 650°C for forming at least one metal layer on the ceramic layer (column 3, lines 20-27), b) structuring the metal layer on at least one surface side of the ceramic layer for forming the structured metal layer with conductive tracks and contact surfaces (column 3, lines 28-31), c) applying the at least one coating of a brazing resist to the structured metal layer after the

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structuring (column 3, lines 33-34), and d) after applying the brazing resist to the structured copper layer, removing some metal from the structured metal layer in surface areas bordering the brazing resist coating (column 3, lines 34-35).

Sakuraba does not explicitly teach removing 0.1 to 20 microns in the removing step. However, one reading the reference as a whole would appreciate that Sakuraba is not concerned with exactly how the steps are formed. Instead of removing material in vertical columns as Sakuraba teaches, one could remove the material in horizontal rows and achieve the same result. The order in which the steps are formed is not critical to the invention. In such a method, first the height marked as t_3 would be removed over lengths l_1 and l_2 to the end of the substrate. Next, the height marked as t_2 would be removed over the length l_1 to the end of the substrate. Finally, the height t_1 would be removed at the end of the substrate. This final removal step for t_1 would remove 20 microns (column 4, lines 15-18). It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the removal of vertical columns for the removal of horizontal rows because the same result is achieved regardless of how the steps are formed. In order to form the steps, the material must be removed one of those two ways, and it would be within the purview of one of ordinary skill in the art to choose one method or the other.

Regarding claim 3, Sakuraba teaches that the high temperature bonding is a direct bonding process (column 3, lines 20-21).

Regarding claim 4, Sakuraba teaches that the high temperature bonding is an active brazing process (column 2, lines 61-64).

Regarding claim 5, Sakuraba teaches that the at least one coating of brazing resist is applied before structuring (column 3, lines 28-29).

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Regarding claim 6, Sakuraba teaches that at least one coating of brazing resist is applied after structuring (column 3, lines 33-35).

Regarding claim 7, Sakuraba teaches that the metal foils are copper foils and they are provided on the ceramic substrate by means of the DCB process (column 3, lines 20-22) or the active brazing process (column 2, lines 61-64).

Regarding claim 8, Sakuraba teaches that structuring of the at least one metal foil takes place by means of masking-etching process and wherein the at least one coating of brazing resist is applied immediately after this structuring (column 8 lines 28-31 and column 3, lines 31-33).

Regarding claim 9, Sakuraba teaches that structuring of the at least one metal foil takes place by means of a masking-etching process using an etching resist and wherein the at least one coating of brazing resist is applied immediately before application of the etching resist (column 3, lines 28-31), where the resist applied to form the steps are brazing resist and etching resists. Therefore, the resist applied to form the first step may be called the brazing resist, and the resist applied to form the next step may be called an etching resist.

Regarding claim 11, Sakuraba teaches that removal takes place by etching, using iron chloride (column 3, lines 28-31).

Regarding claim 21, Sakuraba does not explicitly teach that the at least one brazing resist coating has a thickness of 0.5 to 100 microns. However, it would have been within the purview of one of ordinary skill in the art to apply a brazing resist coating sufficient to protect the underlying material from the etchant without wasting brazing resist.

Regarding claim 23, Sakuraba teaches most of the limitations above with respect to claim 1. Sakuraba additionally teaches b) structuring the metal coating on the at least one surface side

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of the ceramic layer by applying a mask of a photo resist or edging resist and by subsequent to edging away areas of the metal layer which are not covered by the mask of photo resist or etching resists for forming a structured metal layer with the conductive tracks and contact surfaces (column 4, lines 3-6), and c) removing the mask of photo resist and applying at least one coating of brazing resist to the structured metal coating (column 4, lines 7-8). Sakuraba does not use the term "brazing resist." However, in the instant specification, Applicant discloses that the resist is a "brazing resist" simply because it is prevented from migrating through the brazing layer because of the DCB process that took place immediately before (paragraph 0028). Thus, the DCB process followed by application of any resist would similarly prove the resist to be a brazing resist. Therefore, while Sakuraba does not use the phrase "brazing resist," the resist applied still meets the limitations of the claim.

9. Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,054,762 Sakuraba et al as applied to claim 1 above, and further in view of US 4,810,333 Gulla et al.

Regarding claim 13, Sakuraba teaches producing a metal-ceramic substrate by applying a brazing resist coating, but does not teach cleaning first. Gulla teaches a method of producing a printed circuit board where a deposited copper layer is cleaned by removing a surface area of the metal coating (column 9, lines 39-50). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the cleaning step of Gulla in the method of Sakuraba before the resist-applying step because ensuring a clean surface will not only allow the resist to stick better, but will prevent etching of unwanted areas.

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Regarding claim 14, Sakuraba teaches producing a metal-ceramic substrate by applying a brazing resist coating, but does not teach the method of cleaning. Gulla teaches cleaning by chemical removal (column 9, lines 39-50). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the cleaning method of Gulla in the method of Sakuraba because chemical removal is an accepted technique for the removal of surface material from a layer.

Regarding claim 15, Sakuraba teaches producing a metal-ceramic substrate by applying a brazing resist coating, but does not teach the method of cleaning. Gulla teaches chemical removal by using a hydrogen peroxide solution (column 9, lines 39-50).). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the cleaning materials of Gulla in the method of Sakuraba because hydrogen peroxide is a common etchant and removes surface material well.

10. Claims 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,054,762 Sakuraba et al as applied to claim 1 above, and further in view of US 3,429,029 Langdon et al.

Regarding claim 16, Sakuraba teaches producing a metal-ceramic substrate but does not teach applying a metal coating in the removed areas. Langdon teaches making a structured substrate where a surface metal coating is applied to at least one surface area of the at least one metal coating, which area is produced by removal (column 4, lines 8-15). Neither Sakuraba nor Langdon teaches applying the metal coating such that it adjoins the resist coating. However, where the metal is placed is based upon the desired final product. One of ordinary skill in the art would be capable of applying the metal coating wherever one wanted. Additionally, because the

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resist coating is being used as a mask, it only follows that the removed areas would be adjacent to the resist. It would have been obvious to include the coating of Langdon in the method of Sakuraba because structured substrates are created by applying layers in specific locations with the use of resist masks.

Regarding claims 17, 18 and 19, Sakuraba teaches producing a metal-ceramic substrate but does not teach applying a metal coating in the removed areas. Langdon teaches that the surface metal coating is applied such that the surface which has been formed by this surface metal coating is level with (column 4, lines 66-67 and figure 4), projects over (column 5, lines 17-19 and figure 8), or is lower than (column 4, lines 47-48 and figure 6) the surface level of at least one resist coating or of the untreated surface underneath the at least one resist coating. It would have been obvious to include the coating of Langdon in the method of Sakuraba because structured substrates are created by applying layers in specific locations with the use of resist masks.

11. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,054,762 Sakuraba et al as applied to claim 1 above, and further in view of US 6,627,384 Kim et al.

Regarding claim 20, Sakuraba teaches producing a metal-ceramic substrate but does not teach the resist composition. Kim teaches a method of using a resist for structuring a layer where an epoxide-based coating is used for the brazing resist coating and wherein the brazing resist coating cures thermally (column 6, lines 7-13). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the composition and curing method of Kim in the method of Sakuraba because the composition allows for uniformly sized patterns (abstract) and thermal curing is an inexpensive way to cure a resist.

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12. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,054,762 Sakuraba et al as applied to claim 1 above, and further in view of US 5,676,855 Schulz-Harder.

Regarding claim 22, Sakuraba teaches producing a metal-ceramic substrate but does not teach forming optically readable code. Schulz-Harder teaches that the brazing resist coating is structured to form coding (column 4, lines 57-60). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the use of Schulz-Harder in the method of Sakuraba because code can carry information about the product in a simple and efficient manner (column 4, lines 59-64).

Response to Arguments

13. Applicant's arguments with respect to claims 1, 3-9, 11 and 13-23 have been considered but are moot in view of the new ground(s) of rejection over Sakuraba.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MEGHA MEHTA whose telephone number is (571)270-3598. The examiner can normally be reached on Monday to Friday 7:30 am to 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Megha Mehta/
Examiner, Art Unit 1793

/Jessica L. Ward/
Supervisory Patent Examiner, Art Unit 1793